MPS350: Exercises for computer classes

There are several exercises within the lecture notes which require a computer to complete. Many of these provide you with example code and ask you to modify it. You will find this code useful for the project and for re-use in other exercise questions.

1. Several exercises focus on plotting density functions and mass functions related to Bayesian updates. If you have not already worked through these, you should do this first.

   They are exercises **2.1**, **3.1**, **4.1**, **4.5**.

2. Exercise **5.2** gets you do to an elicitation procedure, about your prior beliefs for the maximum temperature tomorrow. Work through this exercise, with a partner (in which case you should both carry out elicitation on each other) or on yourself.

   Do not try to 'improve' your prior beliefs by searching for a weather forecast, or suchlike. This exercise is about eliciting your beliefs – not about how correct/incorrect they are.

   Once you have finished, discuss how well you think the results match your prior beliefs.

3. Some of the exercises on Chapter 7 contain datasets for you to analyse, using hypothesis tests and HPD intervals. You will need a computer for these, to calculate probabilities numerically and to plot graphs.

   On hypothesis tests: exercises **7.2**, **7.3**.

   On HPD intervals: exercises **7.4** (which provides example code), **7.5**, **7.6**(a).

4. Exercise **8.1** provides example code for the Metropolis-Hastings algorithm, and invites you to experiment with the effects of changing several parameters.

   Exercise **8.2** asks you to use this same example code to sample from the posterior in a Bayesian inference problem.